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# THE LOG OF THE LAB

*Items of Current Research*

FOREST PRODUCTS LABORATORY\* FOREST SERVICE

U. S. DEPARTMENT OF AGRICULTURE

Madison, Wisconsin



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## A SMOKELESS SMOKE KILN

SEVERAL steps in advance of the well known "Arkansas smoke kiln," yet nearly as simple and inexpensive in construction, is the heated-air kiln devised at the Forest Products Laboratory for operators of portable saw-mills. The kiln can be so quickly and cheaply constructed that it is essentially portable; it does not blacken the lumber, and it should effectively reduce the hazard of stain and decay as well as the trucking weight of the lumber.

Preliminary results obtained on shortleaf pine with this kiln have been so encouraging that the Laboratory's small-mill specialist believes that operators of portable mills cutting the less refractory woods can well give it a trial. Trial runs indicate that pine boards can be uniformly dried without noticeable degrade in about four days—approximately the same time required by other kilns.

Essentially the portable kiln consists of a housing and roof

built to accomodate two small piles of lumber with a four-foot space between. The double walls, constructed of rough boards, are insulated with sawdust, and a layer of sawdust on tar paper insulates the roof. A section of discarded smokestack lying along the ground between the piles of lumber serves as a firebox. A smoke pipe consisting of a few lengths of large-sized stovepipe takes off from the far end of the firebox and emerges from the front of the kiln near the top, and directly over the entering end of the firebox. Green edgings and slabs are used for fuel.

The portable kiln is not a substitute for the commercial types of kilns developed for permanency to dry greater quantities, or the more refractory woods. It can doubtless be improved, but it is believed to be a good approach to drying problems faced by the operators of small portable mills. The Forest Products Laboratory will be glad to supply a diagram of the kiln and further descriptive matter upon request.

\*Maintained at Madison, Wis., in cooperation with the University of Wisconsin

## CHESTNUT CORES

CHESTNUT has been used as a core material since the very beginnings of the panel industry, and its continued use has served only to emphasize its eminent suitability as a base upon which to glue veneers.

The most essential property in a core is its ability to stay in place or "stay put" under all conditions of service. This property is in turn dependent on a low shrinkage factor, a low ratio of tangential shrinkage to radial shrinkage, and straightness of grain. All of these attributes are characteristic of chestnut.

Good gluing qualities are also of prime importance in a good core wood. Chestnut ranks high in its adaptability to the animal glue used to join the edges of the boards in the core and in its adaptability to the vegetable or casein glue used to put on the face plies. Especially is the wood free from the trouble known to the trade as "starved joint."

Here again the lightness of the wood (low density) reacts in its favor, as it does with regard to handling during fabrication and in the matter of transportation costs.

While chestnut is not noted for exceptional strength, it has this property in the moderate amount needed in core stock. It has a rather coarse grain and

open texture, due to the large pores of the springwood, but the wood is nevertheless soft and enjoys an excellent reputation for working under tools.

A factor of considerable importance in a core wood is its behavior in drying. In this respect chestnut ranks with the best hardwoods in the readiness with which it can be seasoned, even under poor drying conditions.

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### MORE DATA ON UNDER-SIZE TREES

Forest Products Laboratory logging and milling studies show that in any lumbering operation there is a minimum size of tree which just pays its way through the mill; smaller sizes are cut at a loss. Not only is it more costly to handle small trees than large ones, but the lumber sells for less per foot when cut. Analysis of studies completed since our last report on this subject gives the following smallest sizes that should be taken for maximum immediate profit per acre logged: in Arkansas second-growth forest shortleaf and loblolly pine, 12 inches; in Louisiana old-field loblolly, 15 inches; in Virginia second-growth forest loblolly, 12 inches; in North Carolina old-field loblolly, 11 inches; in Texas and western Arkansas virgin shortleaf, 10 to 14 inches, according to type and age of stand.

*To insure a profitable second cut in the relatively near future, the commercial operator should work to larger minimum diameters than the above.*

## THE MYTHOLOGY OF WOOD

(Continued)

7. *THE FALLACY that hickory, or other heavy hardwood, has a higher fuel value than pine.*

This may be true as between a cord of hickory and a cord of pine, as the cord of hickory weighs more; but pound for pound the pine gives off more heat. Resinous woods in general have a higher heat value per pound than non-resinous.

8. *THE FALLACY that sapwood of longleaf pine contains more resin than the heartwood.*

This opinion might be formed by one who had seen the transparent beads of "gum" form on a freshly-cut sapwood surface but not on the heartwood. However, although resin is manufactured in the sapwood it is stored mostly in the heartwood and will not flow from the freshly cut surface of the latter.

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§ IT HAS BEEN VARIOUSLY ESTIMATED that the United States has from 600 million to 900 million acres occupied by or available for forests. Only through a broad and continuing market demand for lumber and other forest products can this vast area be made to yield its proper contribution of wages, profits, and tax values to the nation's wealth. Only profitable markets can assure proper restocking and care of the forest.

To aid the marketing of forest products by pointing the way to improved production and more diversified uses is the principal objective of the Forest Products Laboratory.

## DRYING WALNUT TIMBERS

PROBABLY THE LARGEST black walnut timbers ever dried in a kiln from the green state to final service condition have just been removed from the Forest Products Laboratory's water-spray dry kiln, where their complete seasoning required a little more than four months. These are a dozen 4¼ by 12-inch beams, 12 to 14 feet long. Thorough air drying of pieces of such size would probably take more than three years, and even so they would hardly be dry enough for interior use, and would be almost certain to contain checks and stress.

By extreme care and close control of conditions they were brought out of the kiln at a practically uniform moisture content of 6 per cent clear to the middle, without having developed drying defects of any kind, such as checking, honeycombing, casehardening or the like.

Accurate check was kept on stresses and moisture distribution in the wood throughout the run. Twice stresses were relieved by a nearly saturated humidity treatment at high temperature for ten days. In the finishing stages a temperature of 155 degrees F. and humidity corresponding to a wood moisture content of 5 per cent were used. Casehardening tests on pieces cut from three of the beams showed complete absence of stresses of any kind. The kiln drying of heavy green walnut is a comparatively new idea. During the late war the Laboratory developed kiln schedules for 2¾-inch billets. The present work carries the art a stage farther.

## NEW LABORATORY PUBLICATIONS

1. Forest Products Research for Forest Markets. A mimeographed separate from the Forester's Annual Report describing activities and progress of the Forest Products Laboratory for the fiscal year ending June 30, 1931.

2. Selective Logging in the Loblolly Pine-Hardwood Forests of the Atlantic Coastal Plain with Special Reference to Virginia, Virginia Forest Service Publication No. 43. Report of a study carried on cooperatively by the State of Virginia, the Appalachian Forest Experiment Station, and the Forest Products Laboratory.

3. U. S. D. A. Technical Bulletin No. 262, Improvement in the Production of Oleoresin through Lower Chipping. Setting forth details of tests which show that longleaf and slash pines worked with a narrow chip will yield a higher quality of oleoresin and will submit to a considerably longer leaching period than trees worked with the common wide chip.

4. Oleoresin Production from Longleaf Pine Defoliated by Fire, Journal of Agricultural Research, Volume 43, No. 9, November 1, 1931. Definite information regarding the subsequent yield of trees that have survived an early-winter crown fire.

Copies of these publications will be sent by the Laboratory on request.

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The reputed permanence of ancient gluing is probably due to conditions of exposure favoring the specimens discovered rather than to any superiority of the ancient over modern glues.

## QUESTIONS THE LABORATORY IS ASKED

Q. *What American species are the best substitutes for French briar in the manufacture of pipes?*

A. There are two shrubs found in California, manzanita and wild lilac, whose burls, we believe, are a very fair substitute for French briar. Of the two, wild lilac appears to offer the greater commercial possibilities, owing to the larger size of its burls and their more frequent occurrence. Qualities sought for in woods for pipe bowls are high resistance to charring, freedom from warping and cracking, attractive figure, ability to take color and polish, and a "sweet" taste in continued use.

Q. *What is shingle tow?*

A. Shingle tow is the long, relatively soft, stringy saw kerf produced in sawing northern white cedar shingles parallel to the grain from the rough blocks. Northern white cedar shingles are made chiefly in northern Wisconsin, Michigan, and Maine. We know of only one firm actually marketing shingle tow at present. The material is used by nursery men for packing the roots of trees and shrubs, for packing small plants for shipment, and for stable and kennel bedding.

## BUILDING GOES AHEAD

Thanks to mild weather, all concrete slab and columns of the new Forest Products Laboratory building have been poured, and stone work and other portions of the job are appropriately advanced. One hundred fifty to two hundred workers are employed daily.